

SEQUENCE LISTING

<110> Luo, Ying
Chan, Eva
Xu, Xiang
Huang, Betty
Ossovsckaya, Valeria

<120> Tankyrase H, Compositions Involved in the Cell Cycle and Methods of Use

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<141> 2003-07-08

<150> US 09/843,159

<151> 2001-04-25

<150> US 09/696,668

<151> 2000-10-25

<150> US 09/427,154

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<170> PatentIn version 3.1

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Ala Asp Pro Asn Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu
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Ala Ala Ile Lys Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His
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Gly Ala Glu Pro Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp
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Leu Ala Asp Pro Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys
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Lys Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile
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Val Gln Leu Leu Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys
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Gly Asp Leu Val Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu
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Val Thr Glu Leu Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp
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Leu Trp Gln Phe Thr Pro Leu His Glu Ala Ala Ser Lys Asn Arg Val
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Glu Val Cys Ser Leu Leu Leu Ser Tyr Gly Ala Asp Pro Thr Leu Leu
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Asn Cys His Asn Lys Ser Ala Ile Asp Leu Ala Pro Thr Pro Gln Leu
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Met Val Asn Phe Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys
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Leu Arg Lys Gly Ala Asn Ile Asn Glu Lys Thr Lys Glu Phe Leu Thr
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Val Val Lys His Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln
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Ala Ala Lys Ala Gly Asp Val Glu Thr Val Lys Lys Leu Cys Thr Val
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Gln Ser Val Asn Cys Arg Asp Ile Glu Gly Arg Gln Ser Thr Pro Leu
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Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Gly Leu Val Pro
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Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu
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Val Lys His Gly Ala Val Val Asn Val Ala Asp Leu Trp Lys Phe Thr
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Thr Gln Gly Arg His Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn
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Asn Leu Glu Val Ala Glu Tyr Leu Leu Gln His Gly Ala Asp Val Asn
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Ala Gln Asp Lys Gly Gly Leu Ile Pro Leu His Asn Ala Ala Ser Tyr
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Gly His Val Asp Val Ala Ala Leu Leu Ile Lys Tyr Asn Ala Cys Val
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Asn Ala Thr Asp Lys Trp Ala Phe Thr Pro Leu His Glu Ala Ala Gln
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Lys Gly Arg Thr Gln Leu Cys Ala Leu Leu Leu Ala His Gly Ala Asp
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Pro Thr Leu Lys Asn Gln Glu Gly Gln Thr Pro Leu Asp Leu Val Ser
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Glu Lys Lys Glu Val Pro Gly Val Asp Phe Ser Ile Thr Gln Phe Val
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Arg Asn Leu Gly Leu Glu His Leu Met Asp Ile Phe Glu Arg Glu Gln
 820 825 830

Ile Thr Leu Asp Val Leu Val Glu Met Gly His Lys Glu Leu Lys Glu
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Ile Gly Ile Asn Ala Tyr Gly His Arg His Lys Leu Ile Lys Gly Val
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Glu Arg Leu Ile Ser Gly Gln Gln Gly Leu Asn Pro Tyr Leu Thr Leu
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Asn Thr Ser Gly Ser Gly Thr Ile Leu Ile Asp Leu Ser Pro Asp Asp
 885 890 895

Lys Glu Phe Gln Ser Val Glu Glu Glu Met Gln Ser Thr Val Arg Glu
 900 905 910

His Arg Asp Gly Gly His Ala Gly Gly Ile Phe Asn Arg Tyr Asn Ile
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Leu Lys Ile Gln Lys Val Cys Asn Lys Lys Leu Trp Glu Arg Tyr Thr
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His Arg Arg Lys Glu Val Ser Glu Glu Asn His Asn His Ala Asn Glu
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Arg Met Leu Phe His Gly Ser Pro Phe Val Asn Ala Ile Ile His Lys
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Gly Phe Asp Glu Arg His Ala Tyr Ile Gly Gly Met Phe Gly Ala Gly
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Ile Tyr Phe Ala Glu Asn Ser Ser Lys Ser Asn Gln Tyr Val Tyr Gly
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Ile Gly Gly Gly Thr Gly Cys Pro Val His Lys Asp Arg Ser Cys
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Tyr Ile Cys His Arg Gln Leu Leu Phe Cys Arg Val Thr Leu Gly
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Leu Leu Leu Ala Val Ala Ala Ala Arg Ile Met Ser Gly Arg Arg Cys
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Arg Val Lys Arg Leu Val Thr Pro Glu Lys Val Asn Ser Arg Asp Thr
 115 120 125

Ala Gly Arg Lys Ser Thr Pro Leu His Phe Ala Ala Gly Phe Gly Arg
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Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala Asn Val Gln Ala
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Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala Cys Ser Phe Gly
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His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly Ala Asp Pro Asn
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Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu Ala Ala Ile Lys
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Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His Gly Ala Glu Pro
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Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp Leu Ala Asp Pro
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Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys Asp Glu Leu Leu
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Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Asp Leu Val
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Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp Leu Trp Gln Phe
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Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys Ala Ala Ala Ser
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Ala Ser Glu Lys Ala His Asn Asp Val Val Glu Val Val Val Lys His
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Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln Thr Ser Leu His
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Gly Tyr Asn Arg Val Ser Val Val Glu Tyr Leu Leu Gln His Gly Ala
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Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu Val Lys His Gly
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Lys Leu Ser Ser Pro Asp Asn Val Asn Cys Arg Asp Thr Gln Gly Arg
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His Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Asn Leu Glu Val
 755 760 765

Ala Glu Tyr Leu Leu Gln His Gly Ala Asp Val Asn Ala Gln Asp Lys
770 775 780

Gly Gly Leu Ile Pro Leu His Asn Ala Ala Ser Tyr Gly His Val Asp
785 790 795 800

Val Ala Ala Leu Leu Ile Lys Tyr Asn Ala Cys Val Asn Ala Thr Asp
805 810 815

Lys Trp Ala Phe Thr Pro Leu His Glu Ala Ala Gln Lys Gly Arg Thr
820 825 830

Gln Leu Cys Ala Leu Leu Leu Ala His Gly Ala Asp Pro Thr Leu Lys
835 840 845

Asn Gln Glu Gly Gln Thr Pro Leu Asp Leu Val Ser Ala Asp Asp Val
850 855 860

Ser Ala Leu Leu Thr Ala Ala Met Pro Pro Ser Ala Leu Pro Ser Cys
865 870 875 880

Tyr Lys Pro Gln Val Leu Asn Gly Val Arg Ser Pro Gly Ala Thr Ala
885 890 895

Asp Ala Leu Ser Ser Gly Pro Ser Ser Pro Ser Ser Leu Ser Ala Ala
900 905 910

Ser Ser Leu Asp Asn Leu Ser Gly Ser Phe Ser Glu Leu Ser Ser Val
915 920 925

Val Ser Ser Ser Gly Thr Glu Gly Ala Ser Ser Leu Glu Lys Lys Glu
930 935 940

Val Pro Gly Val Asp Phe Ser Ile Thr Gln Phe Val Arg Asn Leu Gly
945 950 955 960

Leu Glu His Leu Met Asp Ile Phe Glu Arg Glu Gln Ile Thr Leu Asp
965 970 975

Val Leu Val Glu Met Gly His Lys Glu Leu Lys Glu Ile Gly Ile Asn
980 985 990

Ala Tyr Gly His Arg His Lys Leu Ile Lys Gly Val Glu Arg Leu Ile
995 1000 1005

Ser Gly Gln Gln Gly Leu Asn Pro Tyr Leu Thr Leu Asn Thr Ser
1010 1015 1020

Gly Ser Gly Thr Ile Leu Ile Asp Leu Ser Pro Asp Asp Lys Glu
1025 1030 1035

Phe Gln Ser Val Glu Glu Glu Met Gln Ser Thr Val Arg Glu His
1040 1045 1050

Arg Asp Gly Gly His Ala Gly Gly Ile Phe Asn Arg Tyr Asn Ile
1055 1060 1065

Leu Lys Ile Gln Lys Val Cys Asn Lys Lys Leu Trp Glu Arg Tyr
1070 1075 1080

Thr His Arg Arg Lys Glu Val Ser Glu Glu Asn His Asn His Ala
1085 1090 1095

Asn Glu Arg Met Leu Phe His Gly Ser Pro Phe Val Asn Ala Ile
1100 1105 1110

Ile His Lys Gly Phe Asp Glu Arg His Ala Tyr Ile Gly Gly Met
1115 1120 1125

Phe Gly Ala Gly Ile Tyr Phe Ala Glu Asn Ser Ser Lys Ser Asn
1130 1135 1140

Gln Tyr Val Tyr Gly Ile Gly Gly Gly Thr Gly Cys Pro Val His
1145 1150 1155

Lys Asp Arg Ser Cys Tyr Ile Cys His Arg Gln Leu Leu Phe Cys
1160 1165 1170

Arg Val Thr Leu Gly Lys Ser Phe Leu Gln Phe Ser Ala Met Lys
1175 1180 1185

Met Ala His Ser Pro Pro Gly His His Ser Val Thr Gly Arg Pro
1190 1195 1200

Ser Val Asn Gly Leu Ala Leu Ala Glu Tyr Val Ile Tyr Arg Gly
1205 1210 1215

Glu Gln Ala Tyr Pro Glu Tyr Leu Ile Thr Tyr Gln Ile Met Arg
1220 1225 1230

Pro Glu Gly Met Val Asp Gly
1235 1240

<210> 5

<211> 61

<212> DNA

<213> Homo sapiens

<400> 5
gtggaacaga ggggtgcttcc agtttggaga aaaaggaggt tccaggagta gatttttagca 60

t 61

<210> 6

<211> 61

<212> DNA

<213> Homo sapiens

<400> 6
atgcagggga tggcgccgcg ggaacagaaa ggaaggaagg agaagttgct ggtcttgaca 60

t 61

<210> 7

<211> 20

<212> DNA

<213> Artificial sequence

<220>

<223> synthetic

<400> 7
gtggaacaga ggggtgcttcc 20

<210> 8

<211> 1100

<212> PRT

<213> Homo sapiens

<400> 8

Gly Phe Gly Arg Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala
1 5 10 15

Ser Val Gln Ala Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala
20 25 30

Cys Ser Phe Gly His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly
35 40 45

Ala Asp Pro Asn Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu
50 55 60

Ala Ala Ile Lys Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His
65 70 75 80

Gly Ala Glu Pro Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp
85 90 95

Leu Ala Asp Pro Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys
100 105 110

Asp Glu Leu Leu Glu Ser Ala Arg Ser Gly Asn Glu Glu Lys Met Met
115 120 125

Ala Leu Leu Thr Pro Leu Asn Val Asn Cys His Ala Ser Asp Gly Arg
130 135 140

Lys Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile
145 150 155 160

Val Gln Leu Leu Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys
165 170 175

Gly Asp Leu Val Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu
 180 185 190

Val Thr Glu Leu Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp
 195 200 205

Leu Trp Gln Phe Thr Pro Leu His Glu Ala Ala Ser Lys Asn Arg Val
 210 215 220

Glu Val Cys Ser Leu Leu Leu Ser Tyr Gly Ala Asp Pro Thr Leu Leu
 225 230 235 240

Asn Cys His Asn Lys Ser Ala Ile Asp Leu Ala Pro Thr Pro Gln Leu
 245 250 255

Lys Glu Arg Leu Ala Tyr Glu Phe Lys Gly His Ser Leu Leu Gln Ala
 260 265 270

Ala Arg Glu Ala Asp Val Thr Arg Ile Lys Lys His Leu Ser Leu Glu
 275 280 285

Met Val Asn Phe Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys
 290 295 300

Ala Ala Ala Ser Pro Tyr Pro Lys Arg Lys Gln Ile Cys Glu Leu Leu
 305 310 315 320

Leu Arg Lys Gly Ala Asn Ile Asn Glu Lys Thr Lys Glu Phe Leu Thr
 325 330 335

Pro Leu His Val Ala Ser Glu Lys Ala His Asn Asp Val Val Glu Val
 340 345 350

Val Val Lys His Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln
 355 360 365

Thr Ser Leu His Arg Ala Ala Tyr Cys Gly His Leu Gln Thr Cys Arg
 370 375 380

Leu Leu Leu Ser Tyr Gly Cys Asp Pro Asn Ile Ile Ser Leu Gln Gly
 385 390 395 400

Phe Thr Ala Leu Gln Met Gly Asn Glu Asn Val Gln Gln Leu Leu Gln
 405 410 415

Glu Gly Ile Ser Leu Gly Asn Ser Glu Ala Asp Arg Gln Leu Leu Glu
420 425 430

Ala Ala Lys Ala Gly Asp Val Glu Thr Val Lys Lys Leu Cys Thr Val
435 440 445

Gln Ser Val Asn Cys Arg Asp Ile Glu Gly Arg Gln Ser Thr Pro Leu
450 455 460

His Phe Ala Ala Gly Tyr Asn Arg Val Ser Val Val Glu Tyr Leu Leu
465 470 475 480

Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Gly Leu Val Pro
485 490 495

Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu
500 505 510

Val Lys His Gly Ala Val Val Asn Val Ala Asp Leu Trp Lys Phe Thr
515 520 525

Pro Leu His Glu Ala Ala Ala Lys Gly Lys Tyr Glu Ile Cys Lys Leu
530 535 540

Leu Leu Gln His Gly Ala Asp Pro Thr Lys Lys Asn Arg Asp Gly Asn
545 550 555 560

Thr Pro Leu Asp Leu Val Lys Asp Gly Asp Thr Asp Ile Gln Asp Leu
565 570 575

Leu Arg Gly Asp Ala Ala Leu Leu Asp Ala Ala Lys Lys Gly Cys Leu
580 585 590

Ala Arg Val Lys Lys Leu Ser Ser Pro Asp Asn Val Asn Cys Arg Asp
595 600 605

Thr Gln Gly Arg His Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn
610 615 620

Asn Leu Glu Val Ala Glu Tyr Leu Leu Gln His Gly Ala Asp Val Asn
625 630 635 640

Ala Gln Asp Lys Gly Gly Leu Ile Pro Leu His Asn Ala Ala Ser Tyr
 645 650 655
 Gly His Val Asp Val Ala Ala Leu Leu Ile Lys Tyr Asn Ala Cys Val
 660 665 670
 Asn Ala Thr Asp Lys Trp Ala Phe Thr Pro Leu His Glu Ala Ala Gln
 675 680 685
 Lys Gly Arg Thr Gln Leu Cys Ala Leu Leu Leu Ala His Gly Ala Asp
 690 695 700
 Pro Thr Leu Lys Asn Gln Glu Gly Gln Thr Pro Leu Asp Leu Val Ser
 705 710 715 720
 Ala Asp Asp Val Ser Ala Leu Leu Thr Ala Ala Met Pro Pro Ser Ala
 725 730 735
 Leu Pro Ser Cys Tyr Lys Pro Gln Val Leu Asn Gly Val Arg Ser Pro
 740 745 750
 Gly Ala Thr Ala Asp Ala Leu Ser Ser Gly Pro Ser Ser Pro Ser Ser
 755 760 765
 Leu Ser Ala Ala Ser Ser Leu Asp Asn Leu Ser Gly Ser Phe Ser Glu
 770 775 780
 Leu Ser Ser Val Val Ser Ser Ser Gly Thr Glu Gly Ala Ser Ser Leu
 785 790 795 800
 Glu Lys Lys Glu Val Pro Gly Val Asp Phe Ser Ile Thr Gln Phe Val
 805 810 815
 Arg Asn Leu Gly Leu Glu His Leu Met Asp Ile Phe Glu Arg Glu Gln
 820 825 830
 Ile Thr Leu Asp Val Leu Val Glu Met Gly His Lys Glu Leu Lys Glu
 835 840 845
 Ile Gly Ile Asn Ala Tyr Gly His Arg His Lys Leu Ile Lys Gly Val
 850 855 860
 Glu Arg Leu Ile Ser Gly Gln Gln Gly Leu Asn Pro Tyr Leu Thr Leu
 865 870 875 880

Asn Thr Ser Gly Ser Gly Thr Ile Leu Ile Asp Leu Ser Pro Asp Asp
885 890 895

Lys Glu Phe Gln Ser Val Glu Glu Glu Met Gln Ser Thr Val Arg Glu
900 905 910

His Arg Asp Gly Gly His Ala Gly Gly Ile Phe Asn Arg Tyr Asn Ile
915 920 925

Leu Lys Ile Gln Lys Val Cys Asn Lys Lys Leu Trp Glu Arg Tyr Thr
930 935 940

His Arg Arg Lys Glu Val Ser Glu Glu Asn His Asn His Ala Asn Glu
945 950 955 960

Arg Met Leu Phe His Gly Ser Pro Phe Val Asn Ala Ile Ile His Lys
965 970 975

Gly Phe Asp Glu Arg His Ala Tyr Ile Gly Gly Met Phe Gly Ala Gly
980 985 990

Ile Tyr Phe Ala Glu Asn Ser Ser Lys Ser Asn Gln Tyr Val Tyr Gly
995 1000 1005

Ile Gly Gly Gly Thr Gly Cys Pro Val His Lys Asp Arg Ser Cys
1010 1015 1020

Tyr Ile Cys His Arg Gln Leu Leu Phe Cys Arg Val Thr Leu Gly
1025 1030 1035

Lys Ser Phe Leu Gln Phe Ser Ala Met Lys Met Ala His Ser Pro
1040 1045 1050

Pro Gly His His Ser Val Thr Gly Arg Pro Ser Val Asn Gly Leu
1055 1060 1065

Ala Leu Ala Glu Tyr Val Ile Tyr Arg Gly Glu Gln Ala Tyr Pro
1070 1075 1080

Glu Tyr Leu Ile Thr Tyr Gln Ile Met Arg Pro Glu Gly Met Val
1085 1090 1095

Asp Gly
1100

<210> 9

<211> 338

<212> PRT

<213> Homo sapiens

<400> 9

Arg Cys Ser Ala Arg Arg Gly Ala Ala Gly Gly Gln Gly Ala Gln Arg
1 5 10 15

Gly Ala Arg Val Gly Ala Ala His Gly Thr Ala Pro Asp Pro Val Thr
20 25 30

Ala Gly Ser Gln Ala Ala Arg Ala Leu Ser Ala Ser Ser Pro Gly Gly
35 40 45

Leu Ala Leu Leu Leu Ala Gly Pro Gly Leu Leu Leu Arg Leu Leu Ala
50 55 60

Leu Leu Leu Ala Val Ala Ala Ala Arg Ile Met Ser Gly Arg Arg Cys
65 70 75 80

Ala Gly Gly Gly Ala Ala Cys Ala Ser Ala Ala Ala Glu Ala Val Glu
85 90 95

Pro Ala Ala Arg Glu Leu Phe Glu Ala Cys Arg Asn Gly Asp Val Glu
100 105 110

Arg Val Lys Arg Leu Val Thr Pro Glu Lys Val Asn Ser Arg Asp Thr
115 120 125

Ala Gly Arg Lys Ser Thr Pro Leu His Phe Ala Ala Gly Phe Gly Arg
130 135 140

Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala Asn Val Gln Ala
145 150 155 160

Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala Cys Ser Phe Gly
165 170 175

His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly Ala Asp Pro Asn
180 185 190

Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu Ala Ala Ile Lys
195 200 205

Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His Gly Ala Glu Pro
210 215 220

Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp Leu Ala Asp Pro
225 230 235 240

Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys Asp Glu Leu Leu
245 250 255

Glu Ser Ala Arg Ser Gly Asn Glu Glu Lys Met Met Ala Leu Leu Thr
260 265 270

Pro Leu Asn Val Asn Cys His Ala Ser Asp Gly Arg Lys Ser Thr Pro
275 280 285

Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile Val Gln Leu Leu
290 295 300

Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Asp Leu Val
305 310 315 320

Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Thr Glu Leu
325 330 335

Leu Val

<210> 10

<211> 583

<212> PRT

<213> Artificial sequence

<220>

<223> synthetic mutant

<400> 10

Gly Phe Gly Arg Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala
1 5 10 15

Ser Val Gln Ala Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala
20 25 30

Cys Ser Phe Gly His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly
35 40 45

Ala Asp Pro Asn Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu
50 55 60

Ala Ala Ile Lys Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His
65 70 75 80

Gly Ala Glu Pro Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp
85 90 95

Leu Ala Asp Pro Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys
100 105 110

Asp Glu Leu Leu Glu Ser Ala Arg Ser Gly Asn Glu Glu Lys Met Met
115 120 125

Ala Leu Leu Thr Pro Leu Asn Val Asn Cys His Ala Ser Asp Gly Arg
130 135 140

Lys Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile
145 150 155 160

Val Gln Leu Leu Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys
165 170 175

Gly Asp Leu Val Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu
180 185 190

Val Thr Glu Leu Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp
195 200 205

Leu Trp Gln Phe Thr Pro Leu His Glu Ala Ala Ser Lys Asn Arg Val
210 215 220

Glu Val Cys Ser Leu Leu Leu Ser Tyr Gly Ala Asp Pro Thr Leu Leu
 225 230 235 240

Asn Cys His Asn Lys Ser Ala Ile Asp Leu Ala Pro Thr Pro Gln Leu
 245 250 255

Lys Glu Arg Leu Ala Tyr Glu Phe Lys Gly His Ser Leu Leu Gln Ala
 260 265 270

Ala Arg Glu Ala Asp Val Thr Arg Ile Lys Lys His Leu Ser Leu Glu
 275 280 285

Met Val Asn Phe Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys
 290 295 300

Ala Ala Ala Ser Pro Tyr Pro Lys Arg Lys Gln Ile Cys Glu Leu Leu
 305 310 315 320

Leu Arg Lys Gly Ala Asn Ile Asn Glu Lys Thr Lys Glu Phe Leu Thr
 325 330 335

Pro Leu His Val Ala Ser Glu Lys Ala His Asn Asp Val Val Glu Val
 340 345 350

Val Val Lys His Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln
 355 360 365

Thr Ser Leu His Arg Ala Ala Tyr Cys Gly His Leu Gln Thr Cys Arg
 370 375 380

Leu Leu Leu Ser Tyr Gly Cys Asp Pro Asn Ile Ile Ser Leu Gln Gly
 385 390 395 400

Phe Thr Ala Leu Gln Met Gly Asn Glu Asn Val Gln Gln Leu Leu Gln
 405 410 415

Glu Gly Ile Ser Leu Gly Asn Ser Glu Ala Asp Arg Gln Leu Leu Glu
 420 425 430

Ala Ala Lys Ala Gly Asp Val Glu Thr Val Lys Lys Leu Cys Thr Val
 435 440 445

Gln Ser Val Asn Cys Arg Asp Ile Glu Gly Arg Gln Ser Thr Pro Leu
450 455 460

His Phe Ala Ala Gly Tyr Asn Arg Val Ser Val Val Glu Tyr Leu Leu
465 470 475 480

Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Gly Leu Val Pro
485 490 495

Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu
500 505 510

Val Lys His Gly Ala Val Val Asn Val Ala Asp Leu Trp Lys Phe Thr
515 520 525

Pro Leu His Glu Ala Ala Ala Lys Gly Lys Tyr Glu Ile Cys Lys Leu
530 535 540

Leu Leu Gln His Gly Ala Asp Pro Thr Lys Lys Thr Gly Met Glu Ile
545 550 555 560

Leu Leu Trp Ile Leu Leu Lys Met Glu Ile Gln Ile Phe Lys Ile Cys
565 570 575

Leu Gly Glu Met Gln Leu Cys
580

<210> 11

<211> 1100

<212> PRT

<213> Artificial sequence

<220>

<223> synthetic mutant

<400> 11

Gly Phe Gly Arg Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala
1 5 10 15

Ser Val Gln Ala Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala
20 25 30

Cys Ser Phe Gly His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly
 35 40 45

Ala Asp Pro Asn Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu
 50 55 60

Ala Ala Ile Lys Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His
 65 70 75 80

Gly Ala Glu Pro Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp
 85 90 95

Leu Ala Asp Pro Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys
 100 105 110

Asp Glu Leu Leu Glu Ser Ala Arg Ser Gly Asn Glu Glu Lys Met Met
 115 120 125

Ala Leu Leu Thr Pro Leu Asn Val Asn Cys His Ala Ser Asp Gly Arg
 130 135 140

Lys Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile
 145 150 155 160

Val Gln Leu Leu Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys
 165 170 175

Gly Asp Leu Val Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu
 180 185 190

Val Thr Glu Leu Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp
 195 200 205

Leu Trp Gln Phe Thr Pro Leu His Glu Ala Ala Ser Lys Asn Arg Val
 210 215 220

Glu Val Cys Ser Leu Leu Leu Ser Tyr Gly Ala Asp Pro Thr Leu Leu
 225 230 235 240

Asn Cys His Asn Lys Ser Ala Ile Asp Leu Ala Pro Thr Pro Gln Leu
 245 250 255

Lys Glu Arg Leu Ala Tyr Glu Phe Lys Gly His Ser Leu Leu Gln Ala
 260 265 270

Ala Arg Glu Ala Asp Val Thr Arg Ile Lys Lys His Leu Ser Leu Glu
 275 280 285

Met Val Asn Phe Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys
 290 295 300

Ala Ala Ala Ser Pro Tyr Pro Lys Arg Lys Gln Ile Cys Glu Leu Leu
 305 310 315 320

Leu Arg Lys Gly Ala Asn Ile Asn Glu Lys Thr Lys Glu Phe Leu Thr
 325 330 335

Pro Leu His Val Ala Ser Glu Lys Ala His Asn Asp Val Val Glu Val
 340 345 350

Val Val Lys His Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln
 355 360 365

Thr Ser Leu His Arg Ala Ala Tyr Cys Gly His Leu Gln Thr Cys Arg
 370 375 380

Leu Leu Leu Ser Tyr Gly Cys Asp Pro Asn Ile Ile Ser Leu Gln Gly
 385 390 395 400

Phe Thr Ala Leu Gln Met Gly Asn Glu Asn Val Gln Gln Leu Leu Gln
 405 410 415

Glu Gly Ile Ser Leu Gly Asn Ser Glu Ala Asp Arg Gln Leu Leu Glu
 420 425 430

Ala Ala Lys Ala Gly Asp Val Glu Thr Val Lys Lys Leu Cys Thr Val
 435 440 445

Gln Ser Val Asn Cys Arg Asp Ile Glu Gly Arg Gln Ser Thr Pro Leu
 450 455 460

His Phe Ala Ala Gly Tyr Asn Arg Val Ser Val Val Glu Tyr Leu Leu
 465 470 475 480

Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Gly Leu Val Pro
 485 490 495

Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu
500 505 510

Val Lys His Gly Ala Val Val Asn Val Ala Asp Leu Trp Lys Phe Thr
515 520 525

Pro Leu His Glu Ala Ala Ala Lys Gly Lys Tyr Glu Ile Cys Lys Leu
530 535 540

Leu Leu Gln His Gly Ala Asp Pro Thr Lys Lys Asn Arg Asp Gly Asn
545 550 555 560

Thr Pro Leu Asp Leu Val Lys Asp Gly Asp Thr Asp Ile Gln Asp Leu
565 570 575

Leu Arg Gly Asp Ala Ala Leu Leu Asp Ala Ala Lys Lys Gly Cys Leu
580 585 590

Ala Arg Val Lys Lys Leu Ser Ser Pro Asp Asn Val Asn Cys Arg Asp
595 600 605

Thr Gln Gly Arg His Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn
610 615 620

Asn Leu Glu Val Ala Glu Tyr Leu Leu Gln His Gly Ala Asp Val Asn
625 630 635 640

Ala Gln Asp Lys Gly Gly Leu Ile Pro Leu His Asn Ala Ala Ser Tyr
645 650 655

Gly His Val Asp Val Ala Ala Leu Leu Ile Lys Tyr Asn Ala Cys Val
660 665 670

Asn Ala Thr Asp Lys Trp Ala Phe Thr Pro Leu His Glu Ala Ala Gln
675 680 685

Lys Gly Arg Thr Gln Leu Cys Ala Leu Leu Leu Ala His Gly Ala Asp
690 695 700

Pro Thr Leu Lys Asn Gln Glu Gly Gln Thr Pro Leu Asp Leu Val Ser
705 710 715 720

Ala Asp Asp Val Ser Ala Leu Leu Thr Ala Ala Met Pro Pro Ser Ala
 725 730 735

Leu Pro Ser Cys Tyr Lys Pro Gln Val Leu Asn Gly Val Arg Ser Pro
 740 745 750

Gly Ala Thr Ala Asp Ala Leu Ser Ser Gly Pro Ser Ser Pro Ser Ser
 755 760 765

Leu Ser Ala Ala Ser Ser Leu Asp Asn Leu Ser Gly Ser Phe Ser Glu
 770 775 780

Leu Ser Ser Val Val Ser Ser Ser Gly Thr Glu Gly Ala Ser Ser Leu
 785 790 795 800

Glu Lys Lys Glu Val Pro Gly Val Asp Phe Ser Ile Thr Gln Phe Val
 805 810 815

Arg Asn Leu Gly Leu Glu His Leu Met Asp Ile Phe Glu Arg Glu Gln
 820 825 830

Ile Thr Leu Asp Val Leu Val Glu Met Gly His Lys Glu Leu Lys Glu
 835 840 845

Ile Gly Ile Asn Ala Tyr Gly His Arg His Lys Leu Ile Lys Gly Val
 850 855 860

Glu Arg Leu Ile Ser Gly Gln Gln Gly Leu Asn Pro Tyr Leu Thr Leu
 865 870 875 880

Asn Thr Ser Gly Ser Gly Thr Ile Leu Ile Asp Leu Ser Pro Asp Asp
 885 890 895

Lys Glu Phe Gln Ser Val Glu Glu Met Gln Ser Thr Val Arg Glu
 900 905 910

His Arg Asp Gly Gly His Ala Gly Gly Ile Phe Asn Arg Tyr Asn Ile
 915 920 925

Leu Lys Ile Gln Lys Val Cys Asn Lys Lys Leu Trp Glu Arg Tyr Thr
 930 935 940

His Arg Arg Lys Glu Val Ser Glu Glu Asn His Asn His Ala Asn Glu
 945 950 955 960

Arg Met Leu Phe His Gly Ser Pro Phe Val Asn Ala Ile Ile His Lys
 965 970 975

Gly Phe Asp Glu Arg His Ala Tyr Ile Gly Gly Met Phe Gly Ala Gly
 980 985 990

Ile Tyr Leu Ala Glu Asn Ser Ser Lys Ser Asn Gln Tyr Val Tyr Gly
 995 1000 1005

Ile Gly Gly Gly Thr Gly Cys Pro Val His Lys Asp Arg Ser Cys
 1010 1015 1020

Tyr Ile Cys His Arg Gln Leu Leu Phe Cys Arg Val Thr Leu Gly
 1025 1030 1035

Lys Ser Phe Leu Gln Phe Ser Ala Met Lys Met Ala His Ser Pro
 1040 1045 1050

Pro Gly His His Ser Val Thr Gly Arg Pro Ser Val Asn Gly Leu
 1055 1060 1065

Ala Leu Ala Glu Tyr Val Ile Tyr Arg Gly Glu Gln Ala Tyr Pro
 1070 1075 1080

Glu Tyr Leu Ile Thr Tyr Gln Ile Met Arg Pro Glu Gly Met Val
 1085 1090 1095

Asp Gly
 1100

<210> 12

<211> 1083

<212> PRT

<213> Artificial sequence

<220>

<223> synthetic mutant

<400> 12

Gly Phe Gly Arg Lys Asp Val Val Glu Tyr Leu Leu Gln Asn Gly Ala
 1 5 10 15
 Ser Val Gln Ala Arg Asp Asp Gly Gly Leu Ile Pro Leu His Asn Ala
 20 25 30
 Cys Ser Phe Gly His Ala Glu Val Val Asn Leu Leu Leu Arg His Gly
 35 40 45
 Ala Asp Pro Asn Ala Arg Asp Asn Trp Asn Tyr Thr Pro Leu His Glu
 50 55 60
 Ala Ala Ile Lys Gly Lys Ile Asp Val Cys Ile Val Leu Leu Gln His
 65 70 75 80
 Gly Ala Glu Pro Thr Ile Arg Asn Thr Asp Gly Arg Thr Ala Leu Asp
 85 90 95
 Leu Ala Asp Pro Ser Ala Lys Ala Val Leu Thr Gly Glu Tyr Lys Lys
 100 105 110
 Asp Glu Leu Leu Glu Ser Ala Arg Ser Gly Asn Glu Glu Lys Met Met
 115 120 125
 Ala Leu Leu Thr Pro Leu Asn Val Asn Cys His Ala Ser Asp Gly Arg
 130 135 140
 Lys Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn Arg Val Lys Ile
 145 150 155 160
 Val Gln Leu Leu Leu Gln His Gly Ala Asp Val His Ala Lys Asp Lys
 165 170 175
 Gly Asp Leu Val Pro Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu
 180 185 190
 Val Thr Glu Leu Leu Val Lys His Gly Ala Cys Val Asn Ala Met Asp
 195 200 205
 Leu Trp Gln Phe Thr Pro Leu His Glu Ala Ala Ser Lys Asn Arg Val
 210 215 220
 Glu Val Cys Ser Leu Leu Leu Ser Tyr Gly Ala Asp Pro Thr Leu Leu
 225 230 235 240

Asn Cys His Asn Lys Ser Ala Ile Asp Leu Ala Pro Thr Pro Gln Leu
 245 250 255

Lys Glu Arg Leu Ala Tyr Glu Phe Lys Gly His Ser Leu Leu Gln Ala
 260 265 270

Ala Arg Glu Ala Asp Val Thr Arg Ile Lys Lys His Leu Ser Leu Glu
 275 280 285

Met Val Asn Phe Lys His Pro Gln Thr His Glu Thr Ala Leu His Cys
 290 295 300

Ala Ala Ala Ser Pro Tyr Pro Lys Arg Lys Gln Ile Cys Glu Leu Leu
 305 310 315 320

Leu Arg Lys Gly Ala Asn Ile Asn Glu Lys Thr Lys Glu Phe Leu Thr
 325 330 335

Pro Leu His Val Ala Ser Glu Lys Ala His Asn Asp Val Val Glu Val
 340 345 350

Val Val Lys His Glu Ala Lys Val Asn Ala Leu Asp Asn Leu Gly Gln
 355 360 365

Thr Ser Leu His Arg Ala Ala Tyr Cys Gly His Leu Gln Thr Cys Arg
 370 375 380

Leu Leu Leu Ser Tyr Gly Cys Asp Pro Asn Ile Ile Ser Leu Gln Gly
 385 390 395 400

Phe Thr Ala Leu Gln Met Gly Asn Glu Asn Val Gln Gln Leu Leu Gln
 405 410 415

Glu Gly Ile Ser Leu Gly Asn Ser Glu Ala Asp Arg Gln Leu Leu Glu
 420 425 430

Ala Ala Lys Ala Gly Asp Val Glu Thr Val Lys Lys Leu Cys Thr Val
 435 440 445

Gln Ser Val Asn Cys Arg Asp Ile Glu Gly Arg Gln Ser Thr Pro Leu
 450 455 460

His Phe Ala Ala Gly Tyr Asn Arg Val Ser Val Val Glu Tyr Leu Leu
 465 470 475 480

Gln His Gly Ala Asp Val His Ala Lys Asp Lys Gly Gly Leu Val Pro
 485 490 495

Leu His Asn Ala Cys Ser Tyr Gly His Tyr Glu Val Ala Glu Leu Leu
 500 505 510

Val Lys His Gly Ala Val Val Asn Val Ala Asp Leu Trp Lys Phe Thr
 515 520 525

Pro Leu His Glu Ala Ala Ala Lys Gly Lys Tyr Glu Ile Cys Lys Leu
 530 535 540

Leu Leu Gln His Gly Ala Asp Pro Thr Lys Lys Asn Arg Asp Gly Asn
 545 550 555 560

Thr Pro Leu Asp Leu Val Lys Asp Gly Asp Thr Asp Ile Gln Asp Leu
 565 570 575

Leu Arg Gly Asp Ala Ala Leu Leu Asp Ala Ala Lys Lys Gly Cys Leu
 580 585 590

Ala Arg Val Lys Lys Leu Ser Ser Pro Asp Asn Val Asn Cys Arg Asp
 595 600 605

Thr Gln Gly Arg His Ser Thr Pro Leu His Leu Ala Ala Gly Tyr Asn
 610 615 620

Asn Leu Glu Val Ala Glu Tyr Leu Leu Gln His Gly Ala Asp Val Asn
 625 630 635 640

Ala Gln Asp Lys Gly Gly Leu Ile Pro Leu His Asn Ala Ala Ser Tyr
 645 650 655

Gly His Val Asp Val Ala Ala Leu Leu Ile Lys Tyr Asn Ala Cys Val
 660 665 670

Asn Ala Thr Asp Lys Trp Ala Phe Thr Pro Leu His Glu Ala Ala Gln
 675 680 685

Lys Gly Arg Thr Gln Leu Cys Ala Leu Leu Leu Ala His Gly Ala Asp
 690 695 700

Pro Thr Leu Lys Asn Gln Glu Gly Gln Thr Pro Leu Asp Leu Val Ser
705 710 715 720

Ala Asp Asp Val Ser Ala Leu Leu Thr Ala Ala Met Pro Pro Ser Ala
725 730 735

Leu Pro Ser Cys Tyr Lys Pro Gln Val Leu Asn Gly Val Arg Ser Pro
740 745 750

Gly Ala Thr Ala Asp Ala Leu Ser Ser Gly Pro Ser Ser Pro Ser Ser
755 760 765

Leu Ser Ala Ala Ser Ser Leu Asp Asn Leu Ser Gly Ser Phe Ser Glu
770 775 780

Leu Ser Ser Val Val Ser Ser Ser Gly Thr Glu Gly Ala Ser Ser Leu
785 790 795 800

Glu Lys Lys Glu Val Pro Gly Val Asp Phe Ser Ile Thr Gln Phe Val
805 810 815

Arg Asn Leu Gly Leu Glu His Leu Met Asp Ile Phe Glu Arg Glu Gln
820 825 830

Ile Thr Leu Asp Val Leu Val Glu Met Gly His Lys Glu Leu Lys Glu
835 840 845

Ile Gly Ile Asn Ala Tyr Gly His Arg His Lys Leu Ile Lys Gly Val
850 855 860

Glu Arg Leu Ile Ser Gly Gln Gln Gly Leu Asn Pro Tyr Leu Thr Leu
865 870 875 880

Asn Thr Ser Gly Ser Gly Thr Ile Leu Ile Asp Leu Ser Pro Asp Asp
885 890 895

Lys Glu Phe Gln Ser Val Glu Glu Glu Met Gln Ser Thr Val Arg Glu
900 905 910

His Arg Asp Gly Gly His Ala Gly Gly Ile Phe Asn Arg Tyr Asn Ile
915 920 925

Leu Lys Ile Gln Lys Val Cys Asn Lys Lys Leu Trp Glu Arg Tyr Thr
930 935 940

His Arg Arg Lys Glu Val Ser Glu Glu Asn His Asn His Ala Asn Glu
945 950 955 960

Arg Met Leu Phe His Gly Ser Pro Phe Val Asn Ala Ile Ile His Lys
965 970 975

Gly Phe Asp Glu Arg His Ala Tyr Ile Gly Gly Met Phe Gly Ala Gly
980 985 990

Ile Tyr Phe Ala Glu Asn Ser Ser Lys Ser Asn Gln Tyr Val Tyr Gly
995 1000 1005

Ile Gly Gly Gly Thr Gly Cys Pro Val His Lys Asp Arg Ser Cys
1010 1015 1020

Tyr Ile Cys His Arg Gln Leu Leu Phe Cys Arg Val Thr Leu Gly
1025 1030 1035

Lys Ser Phe Leu Gln Phe Ser Ala Met Lys Met Ala His Ser Pro
1040 1045 1050

Pro Gly His His Ser Val Thr Gly Arg Pro Ser Val Asn Gly Leu
1055 1060 1065

Ala Leu Ala Ala Tyr Val Ile Tyr Arg Gly Glu Gln Ala Leu Ser
1070 1075 1080

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<211> 9

<212> PRT

<213> Unknown

<220>

<223> cyclin A destruction box

<400> 13

Arg Thr Val Leu Gly Val Ile Gly Asp
1 5

<210> 14

<211> 9

<212> PRT

<213> Unknown

<220>

<223> Cyclin B1 destruction box

<400> 14

Arg Thr Ala Leu Gly Asp Ile Gly Asn
1 5

<210> 15

<211> 27

<212> PRT

<213> Rattus sp.

<400> 15

Tyr Met Thr Val Ser Ile Ile Asp Arg Phe Met Gln Asp Ser Cys Val
1 5 10 15

Pro Lys Lys Met Leu Gln Leu Val Gly Val Thr
20 25

<210> 16

<211> 28

<212> PRT

<213> Mus sp.

<400> 16

Lys Phe Arg Leu Leu Gln Glu Thr Met Tyr Met Thr Val Ser Ile Ile
1 5 10 15

Asp Arg Phe Met Gln Asn Ser Cys Val Pro Lys Lys
20 25

<210> 17

<211> 27

<212> PRT

<213> Mus sp.

<400> 17

Arg Ala Ile Leu Ile Asp Trp Leu Ile Gln Val Gln Met Lys Phe Arg
1 5 10 15

Leu Leu Gln Glu Thr Met Tyr Met Thr Val Ser
20 25

<210> 18

<211> 27

<212> PRT

<213> Mus sp.

<400> 18

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1 5 10 15

Val Gly Ile Thr Ala Leu Leu Leu Ala Ser Lys
20 25

<210> 19

<211> 18

<212> PRT

<213> Mus sp.

<400> 19

Met Ser Val Leu Arg Gly Lys Leu Gln Leu Val Gly Thr Ala Ala Met
1 5 10 15

Leu. Leu